



# **INDeX 4602 IP Telephone**

## **Installation Manual**

# Contents

<b>Introduction</b> .....	<b>3</b>
Use of this Manual .....	3
Switch Requirements.....	3
Manager PC Requirements .....	3
<b>Installation Procedure</b> .....	<b>4</b>
INDeX Setup .....	4
IPNC Setup .....	4
Installation Requirements .....	5
4602 IP Telephone User PC Connection.....	5
Dynamic Address Process.....	6
Static Addressing Pre-Installation Checklist .....	8
Static Addressing Installation .....	8
<b>Creating the DHCP Scope:</b> .....	<b>12</b>
Adding the 4602 IP Telephone Option (176): .....	14

# Introduction

Supported by INPC Level 3.3 and INDeX 10.1+ software, the 4602 IP Telephone uses Internet Protocol (IP) technology with Ethernet interfaces.

The 4602 IP Telephones support DHCP and TFTP over IPv4/UDP which enhance the administration and servicing of the phones. These phones can use DHCP to obtain dynamic IP addresses and TFTP to download new versions of software for the phones.

The 4602 IP Telephones provide the ability to have an IP connection on the desktop.

In compliance with Australian law, the following information is provided:

*This equipment shall be installed and maintained by trained service personnel. All the input/output ports are classified as Safety Extra Low Voltage (SELV, in the meaning of IEC 60950). To maintain safety compliance when connecting the equipment electrically to other equipment, the interconnecting circuits shall be selected to provide continued conformance of clause 2.3 for SELV circuits (generally, double/reinforced insulation to 240Vac rms to any primary/mains circuitry and 120Vac rms to any Telecommunication network circuitry). To ensure the above conditions are adhered to, only interconnect the equipment with the already approved/certified equipment.*

## Use of this Manual

This manual covers the installation of an Avaya™ INDeX IP 4602 Telephone and is intended for use by installers and administrators who are familiar with INDeX/IPNC and have successfully completed the appropriate training courses.



*Ensure that you have read and understood this Guide before beginning installation.*

For full details of operating the INDeX IP 4602 Telephone, refer to the separate IP 4602 Telephone User's Guide.

## Switch Requirements

- INDeX operating Software Level 10.1+
- INDeX IP Networking Cassette (IPNC) Level 3.3+.

## Manager PC Requirements

- PC Minimum requirements:  
Pentium III 400, Ram 128MB, Hard Drive 1GB, Standard Ethernet card, Multi-media sound card with headset capability, the ability to playing WAV files and handling VoIP calls.  
Windows 98/ME/NT WS/2000 Pro.
- The Operating System can be either Windows NT, Windows 98 or Windows 2000 Professional.

# Installation Procedure

Prior to installation of the INDeX 4602 IP Telephone on a user's networked PC, ensure that both the INDeX and IPNC have been configured as follows:

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## INDeX Setup

Log on to the INDeX and open the **Administration** menu and perform the following:

1. Open **Directory | General Setup | Assign VoIP Users** and enter the IPNC group then the required user number.
2. Open **Directory | General Setup | Reserved numbers** and set the **Remote Login Number** to an unused directory number or leave as the default of 18. Record this number as it will be used latter on in the installation process.
3. Open **Linecard Information | Setup** and ensure that the IPNC is set to an ISDN T type interface.

Refer to the INDeX Programming Manual for details.

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## IPNC Setup

Log on to the IPNC's **Manager** and perform the following:

1. Open **System** and record the IPNC's IP address.  
Consult with the Network Administrator and ensure that the IP addresses of all the PCs (that are to have 4602 IP Telephones installed) are compatible with that of the IPNC, e.g. on the same subnet, etc.
2. Open **User** and create a VoIP user for every 4602 IP Telephones that is to be installed. Ensure that the **Compression mode** is set to automatic.

Refer to the IPNC Administration Manual for details.

## Installation Requirements

To install a 4602 IP Telephone onto INDeX, the following items are required:

- **Power Socket:** A switched 110-240V AC, 50-60Hz, 250-500mA supply socket is required for each 4602 IP telephone.
- **LAN Socket:** A 10/100Mbps RJ45 Ethernet LAN connection point is required for each IP telephone.
- **Category 5 Cabling:** All LAN cables and LAN cable infrastructure used with 4602 IP Telephones must be Category 5 cabling.
- **LAN Cables:** An RJ45 LAN cable is supplied with the 4602 IP Telephone for connection to the Power Unit. This cable is fitted with an emc choke and **must be** used as the connection between the Power Module and the 4602 IP Telephone. You will also need an additional RJ45 (not supplied) LAN cable for connection from the power unit to the customer LAN.
- **1151A1/B1 Power Unit:** The A1 variant does not have an internal battery and the B1 variant does. Neither unit is supplied with the 4602 and must be purchased separately. Both unit supply power via the LAN cable to the 4602 IP telephone. The Power Unit can be replaced with an alternative LAN power supply provided that the supply conforms to IEEE 802.3af.
- **Voice Compression Module:** The IPNC must be fitted with a Voice Compression Module. The size of the module will limit the number of simultaneous VoIP calls.
- **DHCP Server:** The IPNC can perform this role unless another DHCP server already exists.
- **TFTP Server:** The PC running the IPNC Manager application can perform this role. The TFTP server is only required during 4602 IP telephone installation and maintenance.
- **IPNC Manager PC:** A PC running Manager is required for IPNC configuration changes.
- **IP Telephone Software:** The software for IP telephone installation is supplied on the INDeX Administration CD and is part of the IPNC Manager suite.
- **Licence Key:** The 4602 IP telephones do not need a licence key to be entered on the system.

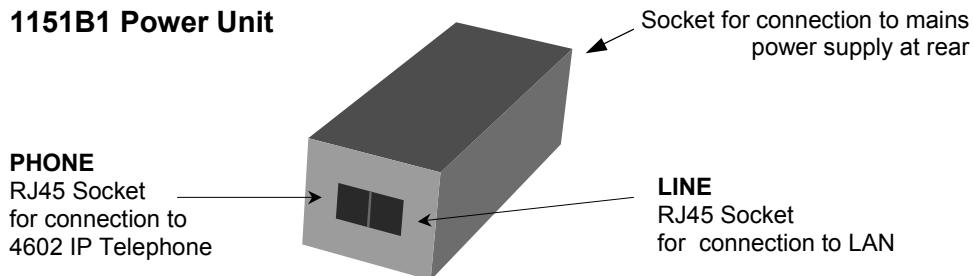
## Dynamic/Static Addressing

The 4602 IP Telephone can be configured on the LAN using either dynamic or static addressing. Dynamic addressing is recommended. The procedures for both are detailed in the following paragraphs.

## 4602 IP Telephone User PC Connection

The Power Unit has one Line input from the LAN and a Phone output to the 4602 IP Telephone as follows:

**1151B1 Power Unit**



The PC's network configuration does not need to be altered from that which it previously used for direct connection to the LAN.

## Dynamic Address Process

This is the recommended method to assign IP and telephony settings to the 4602 IP telephone.

### DHCP Installation Preparation

This installation process uses the INDeX/IPNC as a DHCP Server and H323 Gatekeeper to assign IP and telephony settings to the 4602 IP telephone. It also assumes that the Manager application is used as the TFTP server during installation. This is the simplest method of installation.

1. The INDeX /IPNC must be fitted with a Voice Compression Module (VCM).
  - a. Start the INDeX Monitor application. The initial lines of Monitor output include the item VCOMP= which will state the number of VCM channels installed in the INDeX/IPNC.
2. INDeX/IPNC Settings Using the Manager Application, open the configuration and select the System form. Check the following:
  - a. System Name: In the System tab ensure that a Name for the INDeX/IPNC has been entered.
  - b. TFTP Server IP Address: In the LAN1 tab, enter the IP address of the Manager PC as the TFTP Server IP Address.
  - c. Gatekeeper Settings: In the Gatekeeper tab, ensure that Gatekeeper Enabled and Auto-create Extn Enable are both selected.
  - d. If you have made any changes, upload the new configuration to the INDeX/IPNC.
  - e. Within Manager, select File | Preferences and ensure that the address is 255.255.255.255, otherwise TFTP will not work.
3. IP Phone Software The software for IP telephone installation is supplied on the INDeX Administration CD. The files are copied into the Manager folder during installation of the Manager application.
4. Manager and TFTPLog Leave Manager running. It is also useful to have Manager's TFTP Log visible (select View | TFTPLog). This will display the progress of file requests.

## DHCP Phone Installation

1. Connect the longer LAN cable from the network LAN socket to the power unit's **LINE** socket.
- Note:** The 400B2 Power Adaptor used for providing power for 4602 IP Telephones is not compatible with the sockets on INDeX units. We therefore advise against the direct connection of these adaptors.
3. Connect the shorter LAN cable supplied with the IP telephone from the Power Unit's **PHONE** socket to the socket with a LAN port symbol () at the back of the IP telephone.
4. The phone's message indicator should glow red for a few seconds. The phone will then begin its software loading.
5. After a short delay the phone should display **Initializing** and then **Loading....** The loading phase may take a few minutes.
  - If the phone displays No Ethernet check the connection to the LAN.
6. The phone displays DHCP and a timer. After a few seconds it should complete DHCP negotiation with the Control Unit. If the timer reaches more than 60 seconds then you should suspect a error in either network or DHCP operation.
7. The phone requests the 46xxupgrade.scr file from the TFTP server (Manager). This should be visible in the Manager's TFTP Log.
8. The phone now requests additional files according to the instructions it found in the 46xxupgrade.scr file. The phone will go through a cycle of requesting files, loading files and then transferring the files into its flash memory.
9. Following file loading the phone displays **Ext. =**. Enter the extension number you want applied to the phone and press **#**.
  - **Wrong Set Type** is displayed if you try to use the extension number of an existing non-IP extension.
10. The phone displays **Password =**. Enter the password and press **#**.
11. The phone will briefly display the time and date and then its extension number.
12. Test that you can make and receive calls at the extension.
13. Using Manager, you can now open the Control Unit's configuration and alter the extension and user settings as required:
  - In the list of extensions, the icon indicates VoIP extensions. A new extension will have been created matching the extension number entered above. In the extension's **VoIP** tab, the **Compression Mode** default is **Automatic Selection**. If this needs to be changed select **G.729(a) 8K CS-ACELP**.
  - In the list of users, a new user will have been created matching the extension number entered above.

## Static Addressing Pre-Installation Checklist

Before performing static addressing on the 4602 IP Telephone, verify that have the values for the following parameters. Failure to do so may cause errors during data entry, which will prevent the telephone from working and may have a negative impact on your network. Consult your network administrator and print copies of this checklist for each subnet.

1. The IP Address of the call server/gatekeeper.
2. The IP Address to be allocated to the 4602 IP Telephone.
3. The transport layer port number of the Address of the Management Complex (call server/gatekeeper). Although this may be a value between 0 and 65535, the default value is 1719 and should not be changed unless this conflicts with an existing port assignment.
4. The IP Address of the gateway/router
5. The IP netmask
6. The IP address of the TFTP server.

## Static Addressing Installation

The usual way to assign IP addresses to IP Telephones is the automatic method described in Dynamic Address Process on page 6. There may be times, however, when manual assignment of IP addresses is desired.

The display on the 4602 IP Telephones accommodates up to 24 characters per line.

Use the following procedure to invoke manual address information programming.

1. Start manual address programming by performing one of the following steps:
  - a. During normal DHCP processing, press the \* key before the DHCP process completes.

or

2. While the phone is on-hook and idle, press the following sequence of keys on the faceplate of the telephone:

Mute 2 3 3 7 # (Mute A D D R #)

Press the **Mute** button momentarily. Do not press this button while pressing other keys/ buttons.

The following message is displayed:

Phone=nnn.nnn.nnn.nnn  
New=\_

where “nnn.nnn.nnn.nnn” is the value of the telephone.

2. Enter the IP address for the telephone followed by the # button.

The following message is displayed:

CallSv=nnn.nnn.nnn.nnn  
New=\_

where “nnn.nnn.nnn.nnn” is the value of the call server/gatekeeper IP address.

3. Enter the IP address for the gatekeeper followed by the # button.

The following message is displayed:

```
CallSvPort=nnnn  
New=_
```

where “nnnn” is the value of the Management Complex (call server/gatekeeper) transport layer port number, a value between 0 and 65535.

4. Enter the appropriate value for the port number followed by the # button.

The following message is displayed:

```
Router=nnn.nnn.nnn.nnn  
New=_
```

where “nnn.nnn.nnn.nnn” is the value of the Gateway/router IP address.

5. Enter the IP address of the Gateway/router followed by the # button.

The following message is displayed:

```
Mask=nnn.nnn.nnn.nnn  
New=_
```

where “nnn.nnn.nnn.nnn” is the value of the IP netmask.

6. Enter the IP netmask followed by the # button.

The following message is displayed:

```
FileSv=nnn.nnn.nnn.nnn  
New=_
```

where “nnn.nnn.nnn.nnn” is the value of the TFTP server IP address.

7. Enter the IP address of the TFTP server followed by the # button.

One of the following texts is displayed left-justified at the top of the display, depending on the current status of 802.1Q:

If 802.1Q is off:	802.1Q=off
	1=on #=OK
If 802.1Q is on:	802.1Q=on
0=off #=OK	

8. Press the 1 or 0 button to turn 802.1Q on or off respectively.  
The display is updated to show the current status of 802.1Q.  
Press the # button to continue the procedure without changing the displayed status of 802.1Q.

The following text is displayed left-justified at the top of the display:

```
VLAN ID=dddd
New=_
```

where dddd is the value of the 802.1 VLAN ID.

9. Enter a valid value (between 0 and 4095) for the new value of the 802.1 VLAN ID.

The following message is displayed:

```
Save new values?
*=no #=yes
```

10. Press the # button to save the new values you have entered.

The following message is displayed:

```
New values?
Being saved
```

Once the new values are stored, the telephone is reset.

If a new boot program is downloaded from the TFTP server after you enter static addressing information, you will need to re-enter your static addressing information.

### **QoS Option Setting**

Administering QoS options is not mandatory, but it is highly recommended. The 802.1Q must be switched on for the following procedure to be applicable (see step 8 of Static Addressing Installation).

Use the following procedure to set Quality of Service (QOS) options.

1. While the phone is on-hook and idle, press the following sequence of keys on the faceplate of the telephone:

Mute 7 6 7 # (Mute Q O S #)

The following text is displayed left-justified at the top of the display:

L2 audio=d  
New=\_

where d is the value of the 802.1 audio quality parameter.

2. Enter a valid value (between 0 and 7).

The following text is displayed left-justified at the top of the display:

L2 signaling=d  
New=\_

where d is the value of the 802.1 signaling quality parameter.

3. Enter a valid value (between 0 and 7).

The following text is displayed left-justified at the top of the display:

L3 audio=dd  
New=\_

where dd is the value of the Differential Services audio quality parameter.

4. Enter a valid value (between 0 and 63).

The following text is displayed left-justified at the top of the display:

L3 signaling=dd  
New=\_

where dd is the value of the Differential Services signaling parameter.

5. Enter a valid value (between 0 and 63).

If no new values were entered during this procedure, the following text is displayed left-justified at the top of the display:

No new values  
#=OK

Press # to terminate the procedure.

If new values were entered during this procedure, the following text is displayed left-justified at the top of the display:

Save new values  
\*=OK       #=yes

Press the \* button to terminate the procedure, or the # button to save the new values. If you press the # button, the following text is displayed:

New values?  
Being saved

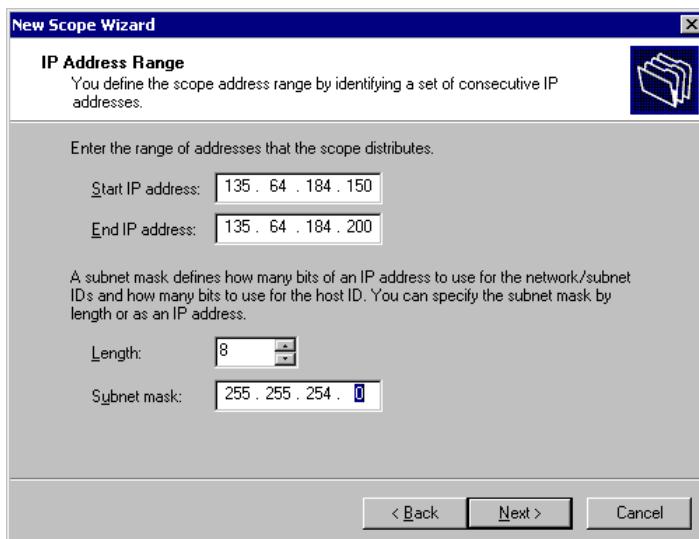
The new values are saved, and the user interface is restored to its previous state.

# Creating the DHCP Scope:

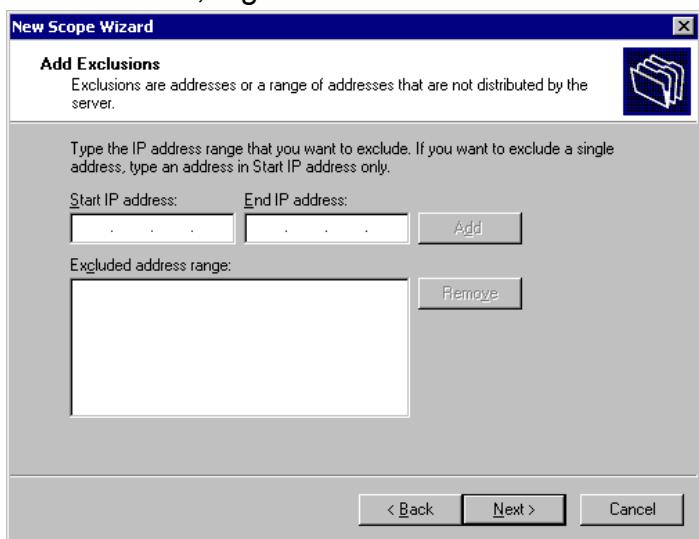
The creation of DHCP Scopes should only be performed by System Administrators with Administrator rights.

DHCP scopes are configured using the DHCP MMC snap-in as follows:

1. Start the DHCP MMC snap-in (Start/Programs/Administrative Tools/DHCP)
2. Right click on the server and select New - Scope from the context menu
3. The scope creation Wizard will be started. Click Next
4. Enter a name and description for the scope. Click Next
5. Enter the address range to use, for example from 200.200.200.1 to 200.200.200.15 (remember the host part cannot be 0). Also enter the subnet mask as either the number of bits used or the actual mask, e.g. 24 is the same as 255.255.255.0. Click Next

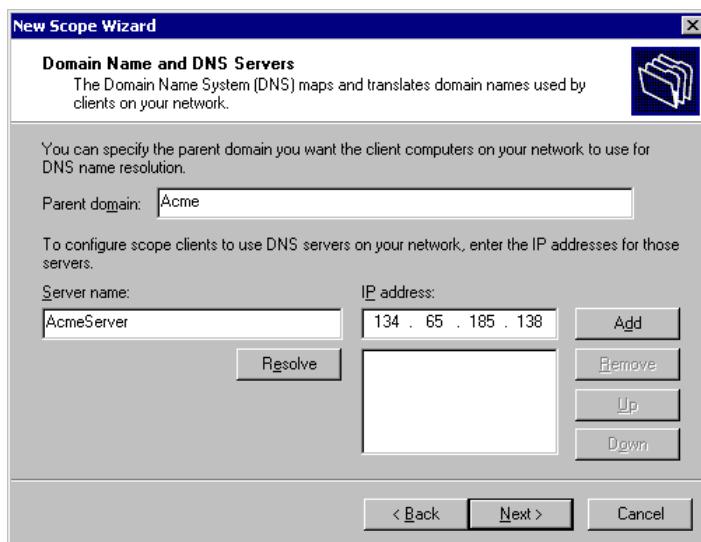


6. You can specify addresses to be excluded either by range, e.g. 200.200.200.5 to 200.200.200.7 and click Add, or just enter a Start address and click Add, e.g. 200.200.200.12 to exclude a single address. Click Next



**NOTE:** You should exclude the IP Office from this range, as the DHCP Options in the IP Office should be disabled. This is only a recommendation. You can also accomplish this by leaving available addresses outside of the scopes range.

7. You can now configure the lease time for the address. Setting too large will mean you will lose the use of addresses if the client machine is inactive for long periods of time, too short and you will generate unnecessary traffic renewing the address. The default 8 days is fine. Click Next
8. The wizard gives the option to configure the most common DHCP options. Select Yes and click Next
9. Enter the address of the gateway, and click Add. You can enter several. Click Next when all are entered.
10. Enter the DNS domain, e.g. savilltech.com and the DNS server addresses. Click Next .

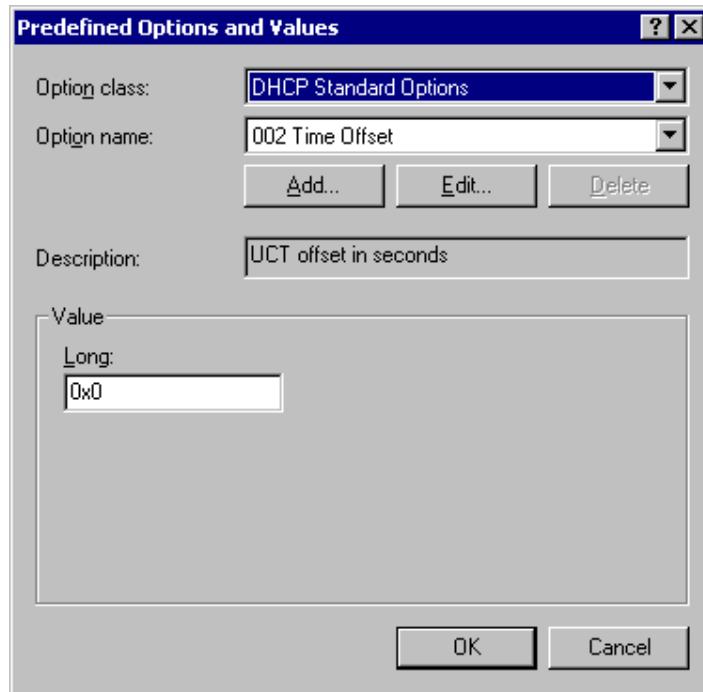


11. Enter the WINS Server Name and IP Address and click Add. Click Next
12. You will then be asked if you wish to activate the scope.  
Select No and click Next
13. Click Finish to the Wizard

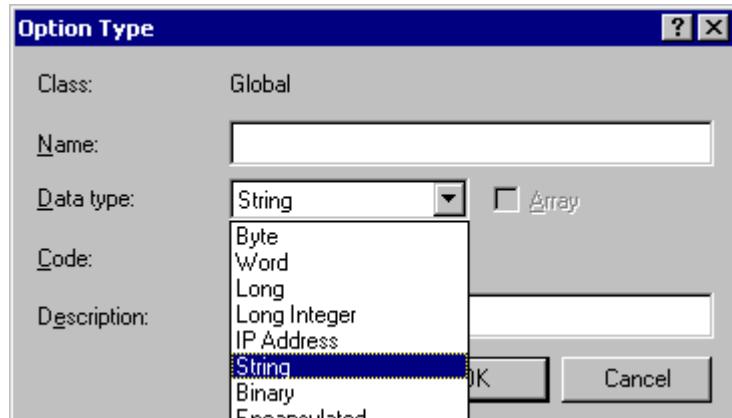
The new scope will now be listed and the status as Inactive.

## Adding the 4602 IP Telephone Option (176):

1. Right click on the server.
2. Select Set Predefined Options from the pop-up menu.



3. Select Add and, from the Data type pull down menu, select String:



4. Enter the following information:

Name: 46xxOptions  
 Data type: String  
 Code: 176  
 Description: IP Phone settings



Click OK when finished.

5. In the string value field enter the following:

*MCIPADD=xxx.xxx.xxx.xxx, MCPORT=1719, TFTPSRVR=yyy.yyy.yyy  
.yyy, TFTPDIR=z* Where:

*xxx.xxx.xxx.xxx* = IP of the INDeX/IPNC

*yyy.yyy.yyy.yyy* = TFTP Server IP Address (of the PC running the INDeX/IPNC Manager application)

*z* = the directory the files are located in. If you are unsure of the location, leave this blank. The PC will look in the default folder of the INDeX/IPNC Manager directory for the required .bin files.

6. Click OK.

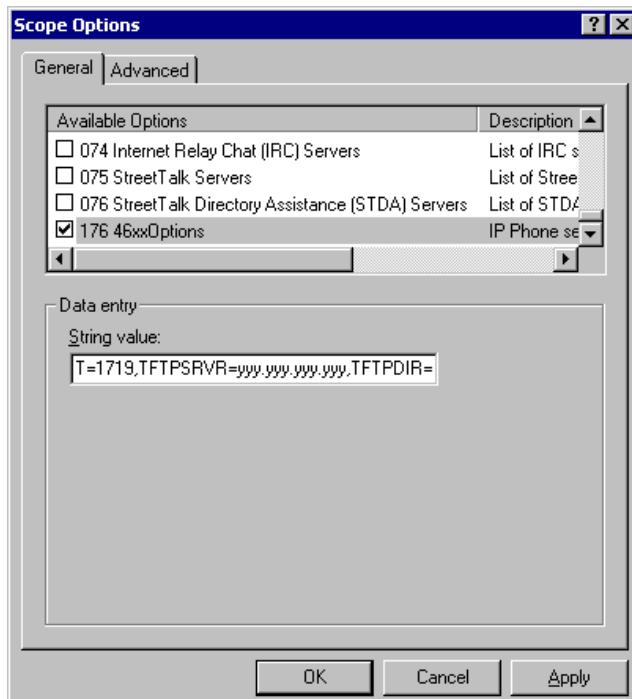
7. Expand the server by clicking on the + next to it.

8. Left click the scope you just created for the phones.

9. In the right hand portion of the screen, where the settings of the scope are, right click the mouse button on Scope Options.

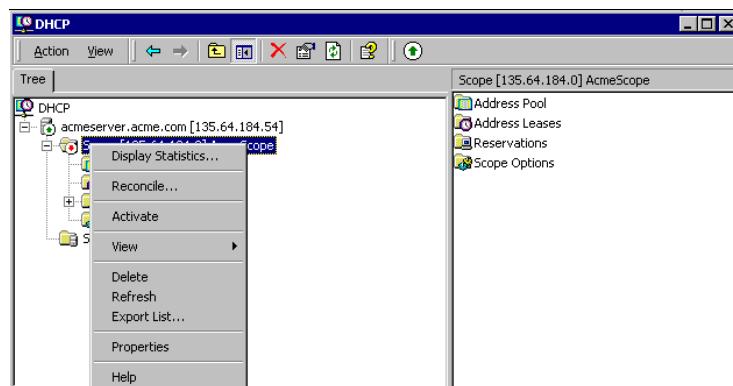
10. Select Configuring Options.

11. Scroll down and make sure 176 is checked:



12. Verify the String value is correct and click OK.

The scope can be manually activated by right clicking on the scope and selecting Activate. The activation is immediate. Likewise you can deactivate by selecting deactivate



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